



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

PMSD / IEP
0586

APR 16 1986

PESTICIDE OFFICE OF
AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: PP#6E3360 (RCB #585). Permethrin on Collards,
Mustard Greens, Turnip Greens, and Turnip Roots.
Evaluation of Analytical Method and Residue Data
(Accession No. 261142).

FROM: Nancy Dodd, Chemist *Nancy Dodd*
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Hazard Evaluation Division (TS-769C)

THRU: Charles L. Trichilo, Ph.D., Chief
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C) *[Signature]*

TO: Hoyt Jamerson, PM #43
Registration Support and Emergency Response Branch
Registration Division (TS-767C)

and

Toxicology Branch
Hazard Evaluation Division (TS-769C)

The petitioner, IR-4, on behalf of the IR-4 National Director, Dr. R.H. Kupelian, and the Agricultural Experiment Stations of Georgia, Florida, North Carolina, Oklahoma, and Texas, requests the establishment of tolerances for residues of the insecticide permethrin [(3-phenoxyphenyl)methyl 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate] and its metabolites 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropane carboxylic acid (DCVA) and (3-phenoxyphenyl)methanol (3-PBA) in or on the raw agricultural commodities collards at 20 ppm, mustard greens at 20 ppm, turnip greens at 20 ppm, and turnip roots at 1 ppm.

In PP#4F3136, ICI Americas Inc. (who has given EPA authorization to use data in their files in support of this IR-4 petition), has also requested the establishment of a 20 ppm permethrin tolerance on Brassica (Cole) Leafy Vegetables

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(Group V) which include, in addition to other crops, mustard greens, collards, kale, and turnip greens. Thus, some deficiencies cited in PP#4F3136 may be relevant to the present IR-4 petition.

Tolerances have been established for residues of permethrin and its metabolites 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid (dichlorovinyl acid; DCVA), and (3-phenoxyphenyl) methanol (3-phenoxybenzyl alcohol; 3-PBA) on various raw agricultural commodities at levels ranging from 0.05 ppm to 60 ppm. Tolerances have been established for residues of permethrin and its metabolites DCVA, 3-PBA, and 3-phenoxybenzoic acid on animal commodities including meat, fat, and meat by-products of cattle, goats, hogs, horses, poultry, and sheep; eggs, and milk fat/whole milk at levels ranging from 0.05 to 3.75 ppm. A tolerance for permethrin per se is established on cottonseed at 0.05 ppm (40 CFR 180.378). There is no Registration Standard for permethrin at this time.

A letter of authorization dated December 20, 1985 has been sent by Robert Ridsdale, Ph.D., of ICI Americas, Inc., to Hoyt Jamerson, Registration Division, Office of Pesticide Programs (RD, OPP) to authorize use of data contained or referenced in Sections A, C, D, and I of PP#8F2044 and EPA Registration Nos. 10182-17 and 10182-18 in support of the IR-4 petition on greens.

A letter of authorization dated February 14, 1984 has been sent by Mark Galley, Ph.D., of FMC Corporation to Hoyt Jamerson, RD, OPP to authorize use of any data contained or referenced in FMC's EPA file for Pounce[®] Technical Insecticide, EPA Registration No. 279-3013, in support of all IR-4 tolerance petitions.

Conclusions

1. A revised Section B/label should be submitted which specifies application by ground equipment only, since available residue data reflect ground applications only.
2. The nature of the residue in collards, mustard greens, and turnips is adequately understood. The residues of concern in collards, mustard greens, and turnips are considered to be permethrin and its metabolites 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylic acid (DCVA) and (3-phenoxyphenyl)methanol (3-PBA).
- 3a. RCB concludes that adequate analytical methods were used to generate residue data for the metabolites DCVA and 3-PBA in collards, mustard greens, turnip greens, and turnip roots.

- 3b. The petitioner has presented or referenced residue data generated in PP#4F3136. Deficiency No. 3a from PP#4F3136 (M. Firestone, December 26, 1984) concerning analytical method GRAM - 1/I for generating residue data for the parent compound is still outstanding. Since some residue data for the parent compound were obtained by method GRAM - 1/I, the petitioner will still need to address that deficiency (No. 3a) so that EPA can validate the residue data which is also pertinent in this IR-4 petition. Deficiency No. 3a is still not resolved.
4. RCB concludes that adequate storage stability data have been submitted for the proposed use on collards, mustard greens, turnip greens, and turnip roots.
5. Geographic representation is not adequate for mustard greens. Additional residue data from FL and from MI, OH, or IN are needed. These data should reflect the maximum number of applications intended at the rate of 0.1 lb ai/A and the proposed 1-day PHI. Of the limited data which are available, the data from GA (4 applications at the rate of 0.1 lb ai/A showing residues of 17.11 ppm) indicate that the number of applications may have to be limited to 4 so that the 20 ppm proposed tolerance is not exceeded. If the petitioner (IR-4) finds that he is unable to satisfy the requirement for residue data on mustard greens, he may want to consider proposing the establishment of a tolerance with regional registrations. However, such a tolerance would not be appropriate for establishing a crop group tolerance as sought in PP#4F3136.
6. Adequate geographic representation is not available for collards. Additional residue data are needed from FL (see Residue Data section of this review for further details).
7. Adequate geographic representation is still not available for turnips. Residue data from CA are needed since CA is a major turnip growing state (see Residue Data Section of this review for further details).
8. No feed items will be involved in this proposed use on collards, mustard greens, and turnips. Thus, no secondary residues are expected to occur in meat, milk, poultry, or eggs as a result of the proposed use. Therefore, this use falls in category 3 of Section 180.6(a) with respect to residues in meat, milk, poultry, and eggs.

9. An International Residue Limit Status sheet is attached to this review. No Codex limits or Mexican tolerances have been established on collards, mustard greens, turnip greens, and turnip roots. Therefore, there will not be any Codex - United States compatibility problem. A Canadian tolerance for permethrin on turnips at 0.1 ppm (negligible residue type tolerance) is established.

Recommendations

At this time, RCB recommends against establishing permethrin tolerances in or on the raw agricultural commodities collards, mustard greens, and turnip greens at 20 ppm and turnip roots at 1 ppm because of reasons given under Conclusions 1, 3b, 5, 6, and 7 above.

Detailed Considerations

Manufacture

RCB refers to a previous review in which the manufacturing process for technical permethrin has been discussed (PP#8F2034, A. Rathman, March 13, 1978). The technical material is approximately 92 percent pure. Impurities in the technical material are not expected to cause a residue problem.

It was noted in PP#8F2044 (A. Rathman, April 24, 1978) that FMC Corp. was producing all the permethrin sold in the United States.

Formulations

Two formulations are to be used: Ambush[®] Insecticide, EPA Registration No. 10182-18 and Pounce[®] 3.2 EC Insecticide, EPA Registration No. 279-3014.

FMC's Pounce[®] 3.2 EC Insecticide contains 38.4 percent active ingredient (3.2 lb ai/gal). All inerts have been cleared under 40 CFR 180.1001.

ICI's Ambush[®] Insecticide is an EC containing 25.6 percent active ingredient (2 lb ai/gal). All inerts have been cleared under 40 CFR 180.1001.

Proposed Use

Collards, Mustard Greens, and Turnip Greens

Spray Ambush[®] Insecticide or Pounce[®] 3.2 EC at the rate of 0.05 to 0.1 lb ai/A in sufficient water to obtain uniform coverage. Repeat as needed, but do not exceed 8 applications.

Do not apply within 1 day of harvest. Do not graze treated areas or feed crop refuse to livestock.

RCB concludes that the Section B/label should be revised to specify application by ground equipment only, since available residue data reflect ground applications only.

Nature of the Residue

Plants

No plant metabolism studies are submitted with this petition. RCB refers to previous reviews of metabolism of permethrin in apples, beans, cabbage, cotton, and tobacco (PP#7G1891, A. Rathman, March 10, 1977; PP#8G2029, A. Rathman, December 27, 1978; and PP#0F2389, J. Onley, April 10, 1981). The major metabolic pathway involves hydrolysis at the ester bond. The major metabolites are 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid (dichlorovinyl acid; DCVA) and (3-phenoxyphenyl) methanol (3-phenoxybenzyl alcohol; 3-PBA).

RCB concludes that the nature of the residue in collards, mustard greens, and turnips is adequately understood. The residues of concern in collards, mustard greens, and turnips are considered to be permethrin and its metabolites 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylic acid (DCVA) and (3-phenoxyphenyl)methanol (3-PBA).

Analytical Method

Plants

Two analytical methods were used to obtain the residue data submitted in this petition:

A method which determined cis- and trans-permethrin (Glenn H. Fujie and Oliver H. Fullmer, J. Agric. Food Chem. Vol. 26, No. 2, pp. 395 to 397, 1978) was used to obtain residue data on turnip roots and tops, mustard greens, and collard greens. High moisture crops are extracted with hexane-isopropanol. The residues are cleaned up on Florisil. Residues are determined by gas-liquid chromatography (GLC) using a ⁶³Ni electron-capture detector or a Coulson electrolytic conductivity detector. The reported sensitivity of the method is 0.05 ppm. Control values were up to 1.56 ppm cis- and 1.90 ppm trans-permethrin in mustard greens, up to 0.146 ppm cis- and 0.161 ppm trans-permethrin in turnip roots, up to < 0.047 ppm cis- and < 0.048 ppm trans-permethrin in turnip greens, and up to 1.37 ppm cis- and 1.08 ppm trans-permethrin in collard greens. Recoveries at fortification levels of approximately 0.05 to 0.3 ppm were 45.2 to 109.8 percent for

mustard greens, 77.3 to 115.4 percent for turnip roots, 82.7 to 112.5 percent for turnip tops, and 76.9 to 118.8 percent for collard greens.

A method used on turnip roots and tops to determine permethrin and its metabolites DCVA and 3-PBA was George et al., "Synthetic Pyrethroids: Methodology and Applications, ACS Symposium Series No. 42, pp. 201 to 220, 1977. The sample is blended with methylene chloride acidified with concentrated HCl. The filtrate is extracted with sodium hydroxide. Permethrin and the alcohol metabolite are extracted from the sodium hydroxide into methylene chloride. The methylene chloride (fraction A) is washed with water. The water wash and sodium hydroxide (together designated fraction B) are acidified with HCl and washed with methylene chloride. The permethrin and alcohol metabolite in fraction A are separated by chromatography through Bakers aluminum oxide. The alcohol metabolite is derivatized with trichloroacetyl chloride. The acid metabolite (fraction B) is derivatized with trichloroethanol. Permethrin and the derivatives are determined by gas chromatography with an electron-capture detector. Some controls, which show residues up to 0.21 ppm acid metabolite and 0.10 ppm alcohol metabolite in roots and up to 0.14 ppm permethrin in foliage, are assumed by the petitioner to be contaminated. Recoveries from turnip roots treated at 0.1 to 1.0 ppm were 59.0 to 107.5 percent permethrin, 80.0 to 125.0 percent alcohol metabolite, and 68.0 to 110.0 percent acid metabolite. Recoveries from turnip greens treated at 0.1 to 1.0 ppm were 66.0 to 133.0 percent permethrin, 84.0 to 125.0 percent alcohol metabolite, and 67.0 to 114.0 percent acid metabolite. The reported method sensitivities are 0.01 ppm permethrin, 0.05 ppm alcohol metabolite, and 0.05 ppm acid metabolite.

The enforcement method for permethrin in all crops is Method I in PAM II. Method I was submitted by FMC Corp. with PP#8F2034. Residues of cis- and trans-permethrin are determined separately or as total permethrin by GLC with Coulson conductivity detection or electron-capture detection. Reported sensitivity of the method is 0.05 ppm.

The enforcement method for the permethrin metabolite m-phenoxybenzyl alcohol (3-PBAlc) in all crops is Method III in PAM II. This method was submitted by FMC Corp. with PP#9F2196. 3-PBAlc is determined by GLC with electron-capture detection. The reported method sensitivity is 0.01 ppm.

The enforcement method for the permethrin metabolite dichlorovinyl acid (DCVA) in all crops is Method IIIA in PAM II. This method was submitted by FMC Corp. with PP#9F2196. DCVA is determined by GLC with electron-capture detection. The reported method sensitivity is 0.01 ppm.

A satisfactory method trial has been conducted for permethrin per se on cottonseed (Pesticide Analytical Manual, Vol. II, Method I). A satisfactory method trial has been conducted for permethrin and its metabolites DCVA, 3-PBAIc, and 3-PBAIc in soybeans and liver (PP#8F2099, J. Onley, July 28, 1982).

The following deficiencies concerning analytical methods were found in connection with PP#4F3136 (M. Firestone, December 26, 1984):

- 3a. Analytical method GRAM-1/I was used for the determination of permethrin (parent compound only) residue data submitted in this petition. A version of this method has passed EPA method trial. The petitioner will need to submit the following before RCB can make any conclusion concerning the adequacy of method GRAM-1/I to generate permethrin (parent compound only) residue data:
 - a. A discussion of how the 78 percent (spinach) and 92 percent (mustard) recovery values were calculated. According to the raw data sheets, these values actually appear to be 106 percent and 124 percent, respectively.
 - b. Raw data sheets for ICI Report TMU1317/B (reference 4D).
 - c. A description of which greens were fortified in conjunction with ICI report TMU1317/B (this information is probably included in the raw data sheets requested above).
- 3b. Methods GRAM-5/2 and -5/3 were used to generate the DCVA and 3-PBAIc residue data submitted in this petition. A version of these methods has successfully passed EPA method trial.

RCB can reach no final conclusion concerning the adequacies of methods GRAM-5/2 and -5/3 to generate permethrin metabolite (DCVA and 3-PBAIc) residue data on Brassica (cole) leafy vegetables until the petitioner submits raw data sheets for ICI Report TMU1319/B (reference 5D) including information concerning which greens were used to generate the submitted fortification-recovery data.

Raw data sheets for ICI report TMU 1319/B (Analytical Methods GRAM-5/2 and GRAM -5/3) are submitted (Tab 9-2). These data sheets were requested by EPA in connection with PP#4F3136 (Deficiency No. 3b of the review by M. Firestone, dated December 26, 1984). The following recoveries are reported on the submitted data sheets:

Recoveries (%)

Crop	DCVA	3-PBA1c
Kale	76.4-102	63.4-93
Mustard greens	68.8-98.3	78.8-85.6
Turnips	67.4	62.5
Spinach	83.0	--
Collard greens	74.2-83.0	81.5-83.5

RCB concludes that adequate analytical methodology (methods GRAM -5/2 and -5/3) was used to generate residue data for metabolites DCVA and 3-PBA1c in collards, mustard greens, turnip greens, and turnip roots.

However, Deficiency No. 3a from PP#4F3136 (M. Firestone, December 26, 1984) concerning the residue data generated by analytical method GRAM -1/I is still outstanding. Since some residue data for the parent compound were obtained by method GRAM -1/I, the petitioner, ICI, will still need to address that deficiency so that EPA can validate that residue data which is also pertinent in this IR-4 petition. Deficiency No. 3a is still not resolved.

Residue Data

Storage Stability

Storage stability studies were previously reviewed on lettuce, Brussels sprouts, flue-cured tobacco, cottonseed, alfalfa, and lettuce.

No loss of permethrin during storage occurred in lettuce, Brussels sprouts, or flue-cured tobacco stored at 0 °F for approximately 19 months (PP#8F2034, A. Rathman, March 13, 1978) or on cottonseed (PP#7G1891, A. Rathman, March 10, 1977). However, Brassica crops were stored frozen for up to 49 months before analysis. RCB requested (PP#4F3136, M. Firestone, December 26, 1984) that the petitioner submit storage stability data which show that residues of permethrin and its metabolites (DCVA and 3-PBA1c) are stable for up to 49 months under frozen conditions (preferably in a Brassica leafy vegetable).

Storage stability of the primary metabolites DCVA and 3-PBA were determined on field treated green alfalfa, alfalfa hay, and lettuce stored at -20 °C (0 °F) for 33 months. The petitioner stated that no residue decline was observed except for DCVA in lettuce (26%; 0.8%/month) (PP#5F3271, N. Dodd, August 14, 1985).

A 52-month storage stability study in grain sorghum (grain, stover, and forage) is now submitted. Samples were stored at -10 °F (except for temporary increases to 40 °F every 12 hours because of the frost-free feature of the freezer). Initial values (0 months after harvest) are not reported. Reported values are listed in the following table:

	<u>Residues (ppm) at</u> <u>Months after Harvest (MAH)</u>		
	<u>16 MAH</u>	<u>52 MAH</u>	<u>% change</u>
Forage	20	19	-5.0
Stover	27	25	-7.4
Grain	4.0	4.1	+2.5
	<u>4 MAH</u>	<u>26 MAH</u>	
Stover	4.6	4.5	-2.2
Grain	0.76	0.89	+17.1
	<u>18 MAH</u>	<u>40 MAH</u>	
Forage	17	14	-17.7
Stover	10	12	+20.0

The petitioner submits recoveries for mustard greens, collard greens, turnip greens, and turnip roots which were stored for 7 to 9 months:

Crop	Fortification (ppm)	Length of Storage (Months)	<u>Recoveries (%)</u>		
			Permethrin	3-PBA	DCVA
Turnip roots	0.25-1.0	9	84-118	72-86	67-94
Turnip greens	0.25-1.0	9	92-104	70-91	69-78
Turnip roots	0.25	8	37-57	--	--
Mustard greens	0.25	7	45-98	--	--
Collard greens	0.25	9	55-67	--	--

Residue data which are now submitted are on mustard greens, collards, and turnips which were stored for 5 to 12 months.

RCB concludes that adequate storage stability data have been submitted for the proposed use on collards, mustard greens, turnip greens, and turnip roots.

Mustard, Collards, and Turnips

Residue data on mustard, collards, and turnips which were previously submitted (PP#4F3136, M. Firestone, December 26, 1984) are tabulated below (application rate = 0.1 lb ai/A):

State	Crop	# Appl.	PHI (days)	Residue levels (ppm)			
				Permethrin	DCVA	3-PBA1c	Total
GA	Mustard	4	1	9.74	5.78	1.59	17.11
AZ	Mustard	7	0	5.03	6.16	0.18	11.37
AZ	Mustard	7	1	5.87	8.30	0.28	14.45
CA	Mustard	9	0	6.60	3.61	0.55	10.76
CA	Mustard	9	1	5.48	2.46	0.45	8.39
AZ	Collards	7	0	5.21	3.44	0.09	8.74
AZ	Collards	7	1	5.34	5.63	0.30	11.27
NC	Collards	8	0	0.76	0.76	0.14	1.66
NC	Collards	8	1	1.48	0.78	0.11	2.37
GA	Turnips	4	1	2.18	1.16	0.06	3.40
FL	Turnips	6	0	11.37	3.54	0.60	15.51
FL	Turnips	6	1	8.18	5.40	0.75	14.33

Additional studies on turnips, mustard greens, and collards are submitted with this IR-4 petition. Four studies were conducted on turnips in the states of IN, TX, SC, and WA. Two studies were conducted on mustard greens in the states of WA and SC. Two studies were conducted on collards in the states of WA and SC. Application rates were 0.1 or 0.2 lb ai/A. PHI's were 1, 3, and 5 days. Reported residues are tabulated below:

Turnip Roots

# Appl.	Rate (lb ai/A)	PHI (Days)	Residue Levels (ppm)		
			Permethrin	DCVA	3-PBA1c
8	0.1	1	0.07-0.12	ND	ND-0.18
8	0.1	3-5	0.02-0.05	ND	ND-0.38
8	0.2	1	0.07-0.11	ND	ND-0.08
8	0.2	3-5	0.02-0.13	ND-0.33	ND-0.14
5	0.1	1	< 0.12	NA	NA

Turnip Roots (cont'd)

# Appl.	Rate (lb ai/A)	PHI (Days)	Residue Levels (ppm)		
			Permethrin	DCVA	3-PBA1c
5	0.1	3-5	< 0.1-0.2	NA	NA
5	0.2	1	< 0.1	NA	NA
5	0.2	3-5	< 0.1-0.18	NA	NA
4	0.1	1	0.05	NA	NA
4	0.1	3-5	< 0.03-< 0.04	NA	NA
4	0.2	1	< 0.05	NA	NA
4	0.2	3-5	< 0.03-< 0.04	NA	NA

Turnip Tops

# Appl.	Rate (lb ai/A)	PHI (Days)	Residue Levels (ppm)		
			Permethrin	DCVA	3-PBA1c
8	0.1	1	3.28-8.25	ND-0.28	0.06-0.07
8	0.1	3-5	1.63-3.34	0.35-0.61	ND-0.17
8	0.2	1	7.45-8.80	ND-0.07	< 0.05-0.17
8	0.2	3-5	1.59-6.64	0.25-1.09*	ND-0.14
4	0.1	1	2.4	NA	NA
4	0.1	3-5	1.6-1.9	NA	NA
4	0.2	1	5.0	NA	NA
4	0.2	3-5	2.2-3.2	NA	NA

Mustard Greens

# Appl.	Rate (lb ai/A)	PHI (Days)	Residue Levels (ppm)
			Permethrin
5	0.1	1	3.6-4.0
5	0.1	3-5	2.3-4.3
5	0.2	1	5.1-9.5
5	0.2	3-5	2.8-7.4

Collard Greens

# Appl.	Rate (lb ai/A)	PHI (Days)	Residue Levels (ppm)
			Permethrin
7	0.1	1	4.8
7	0.1	3-5	2.0-3.5
7	0.2	1	5.4
7	0.2	3-5	2.0-3.0
5	0.1	1	11.3
5	0.1	3-5	6.5-8.1
5	0.2	1	21.8
5	0.2	3-5	11.3-14.9

ND- Not Detectable

NA- No Analysis

* - This value appears as 0.09 (p.53) and 1.09 (p.45).

Mustard Greens

RCB previously concluded (PP#4F3136, M. Firestone, December 26, 1984) that the limited residue data on mustard greens indicated that 4 applications at the rate of 0.1 lb ai/A could be applied without exceeding a proposed 20 ppm tolerance for total permethrin residues (parent plus DCVA and 3-PBA1c), but that geographic representation was not adequate. RCB further indicated that additional residue data from FL and either MI, OH, or IN reflecting the maximum number of proposed applications and the minimum PHI would be needed.

Additional data on mustard greens are now submitted from WA and SC. In WA, 5 ground applications of Ambush 2E were made at 7-9 day intervals. In SC, 5 ground applications of Pounce 3.2 EC were made at 6-8 day intervals. In both WA and SC, samples were analyzed for cis- and trans-permethrin.

RCB concludes that geographic representation is still not adequate for mustard greens. Additional residue data from FL and from MI, OH, or IN are needed. These data should reflect the maximum number of applications intended at the rate of 0.1 lb ai/A and the proposed 1-day PHI. Of the limited data which are available, the data from GA (4 applications at the rate of 0.1 lb ai/A showing residues of 17.11 ppm) indicate that the number of applications may have to be limited to 4 so that the 20 ppm proposed tolerance is not exceeded. If IR-4 wants to apply more than 4 applications, additional residue data from the same site in GA reflecting the maximum number of applications specified on the label may clarify whether a greater number of applications would result in the need for a permethrin tolerance greater than 20 ppm.

If the petitioner (IR-4) finds that he is unable to satisfy the requirement for residue data on mustard greens, he may want to consider establishing a tolerance with regional registrations. However, such a tolerance would not be appropriate for establishing a group tolerance as sought in PP#4F3136.

Collards

Based on the two studies which were available for collards (i.e., maximum residues of 11.27 ppm from 7 applications of 0.1 lb ai/A and a 1-day PHI), RCB suggested that a 15 ppm tolerance may be more appropriate than the proposed 20 ppm tolerance (PP#4F3136, M. Firestone, December 26, 1984). However, RCB concluded in that previous review that additional residue data were needed from FL and one other Southeast or Gulf State.

Additional data on collards are now submitted from WA and SC. In WA, 7 ground applications of Ambush 2E were made at 7-9 day intervals. In SC, 5 ground applications of Pounce 3.2 EC were made at 6-8 day intervals. In both WA and SC, samples were analyzed for cis- and trans-permethrin.

RCB concludes that adequate geographic representation is not available for collards. Additional residue data are needed from FL.

If the petitioner finds that he is unable to satisfy the requirement for residue data on collards, he may want to consider proposing the establishment of a tolerance with regional registrations.

Turnips

Among previously submitted residue data (see RCB's December 26, 1984 review of PP#4F3136) on turnips, the highest reported residues were 15.51 ppm for six applications in FL at the rate of 0.1 lb ai/A and a 0-day PHI. RCB concluded that adequate geographic representation was not available and that additional residue data on turnip greens and roots were needed from CA, TX, and IL reflecting the maximum number of applications.

Additional data on turnips are now submitted from IN, TX, SC, and WA. In IN, 8 ground applications of Ambush 2E were made at 6-9 day intervals. In TX, 8 ground applications of Ambush (EPA Registration No. 10182-18) were made at 6-8 day intervals. In IN and TX, samples were analyzed for permethrin and its metabolites dichlorovinyl acid and m-phenoxybenzyl alcohol. In SC, 5 ground applications of Pounce 3.2 EC were made at 6-8 day intervals. In WA, 4 ground applications of Ambush 2E were made at 7-day intervals. In both SC and WA, samples were analyzed for cis- and trans-permethrin.

RCB concludes that adequate geographic representation is still not available for turnips. Residue data from CA are needed since CA is a major turnip growing state. However, as stated above, the petitioner may want to consider proposing the establishment of a tolerance with regional registrations on turnips.

Meat, Milk, Poultry, and Eggs

No feed item is involved with this use on collards.

Turnip tops and roots are under grower control; the label prohibits grazing treated areas or feeding crop refuse to livestock. Thus, no secondary residues are expected to

occur in meat, milk, poultry, or eggs as a result of the proposed use. Therefore, this use falls in category 3 of Section 180.6(a) with respect to residues in meat, milk, poultry, and eggs.

Other Considerations

An International Residue Limit Status sheet is attached to this review. No Codex limits or Mexican tolerances have been established on collards, mustard greens, turnip greens, and turnip roots. Therefore, there will not be any Codex - United States compatibility problem. A Canadian tolerance for permethrin on turnips at 0.1 ppm (negligible residue type tolerance) is established.

Attachment 1: International Residue Limit Status Sheet

cc: R.F., Circu, Reviewer - N. Dodd, EEB, EAB, PP#6E3360,
PP#4F3136, FDA, PMSD/ISB-Eldredge
RDI:J.H. Onley:4/3/86:RD Schmitt:4/3/86
TS-769:RCB:CM#2:RM 810:X1681:NDodd:Kendrick & Co.:4/10/86

CHEMICAL permethrinPETITION NO 6E3360CCPR NO. 120*Final Dec 7/26/86*

Codex Status _____

Proposed U. S. Tolerances _____

☐ No Codex Proposal
Step 6 or aboveResidue (if Step 9): permethrin (sum of isomers)Residue: permethrin and its metabolites
DCVA and 3-PBA

Crop(s)	Limit (mg/kg)
none (on these commodities)	

Crop(s)	Tol. (ppm)
collards	20
mustard greens	20
turnip greens	20
turnip roots	1

CANADIAN LIMIT

Residue: _____

permethrin

Crop	Limit (ppm)
turnips	0.1

MEXICAN TOLERANCIA

Residue: _____

Crop	Tolerancia (ppm)
none	

Notes:

Negligible residue type tolerance